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THE NATIVE PAPAW

U. S. DEPARTMENT OF AGRICULTURE

LEAFLET No 179

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By H. P. Gould, *principal horticulturist, in charge, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry*

But little of importance has been written concerning the native papaw, doubtless because little has been done toward its domestication. It still remains largely an unknown fruit from the standpoint of improvement through cultivation. It has been the subject of a considerable number of brief popular articles in the horticultural and agricultural press, in many cases mainly expressions of the high favor in which the fruit was held by the writers or narratives of personal experiences with the fruit. One or two State horticultural societies have published short articles on the papaw, and it is briefly discussed in horticultural encyclopedias. A brief pamphlet (no longer available) by the late James A. Little, of Indiana, entitled "A Treatise on the Papaw," is a more ambitious study of this fruit than most of the articles published. This, however, is a rather personal discussion and consists in part of an expression of the writer's fondness for the fruit and his estimate of it.

While considerable information concerning the papaw is to be found in such articles, it is, nevertheless, fragmentary and incomplete, and perhaps not all the experience described could be repeated with like results. One of the most informing articles that has appeared was published under the title "The Best Pawpaws," in the Journal of Heredity, volume 8, No. 1, pages 21–33, in January 1917. The substance of this article was based on information received incident to a prize offered by the Journal for reports on trees and fruits of the papaw of special merit.

This leaflet is based largely on a review of the meager literature of the subject.

Name and Relationship

The name is written in various ways, including "papaw," as in the title, "pawpaw," and "paw-paw." There are four post offices bearing this name, one of which, according to the United States Official Postal Guide, is written "Pawpaw" and the others "Paw Paw." The form preferred as applied to the fruit is "papaw." The designation "Indiana banana" has also been used.

The native papaw belongs to the Annonaceae or custard-apple family and is known to botanists under the name *Asimina triloba*. All the other main groups of this plant family are tropical or subtropical in their distribution and include such fruits as the soursop, sweetsop, pond-apple, custard-apple, and cherimoya. There are several species of *Asimina*, but only two, *A. triloba* and *A. grandiflora*, are cultivated. The former is the hardier and more widely distributed; the latter has the larger and more showy flowers and occurs in southern

Issued February 1939

169903°—39

Georgia and Florida. The other species of *Asimina* occur in the South.

The papaw of the general literature, also commonly called melon papaw but preferably papaya, belongs to an entirely different botanical group. The botanists know it as *Carica papaya.* It is a subtropical tree or plant the fruit of which is 6 to 12 inches long, or even longer; the form is globular to oblong or melon-shaped. Very large specimens may weigh as much as 20 pounds. The juice is the source of a digestive enzyme known as papain. Meat is said to be made tender if the juice of the leaves or other parts of the plant or fruit is rubbed on it. Confusion may easily result from the use of the name "papaw" in referring to two such very different fruits, unless the context is taken fully into account.

Range of Distribution and Habitat

Of the two species of native papaw, *Asimina triloba* and *A. grandiflora*, only the former, the more hardy one, is prized for its fruit, and it is the one that forms the subject of this discussion. This is the fruit that most people refer to when speaking merely of the "papaw," without qualification of any kind, except when the name is applied to *Carica papaya*, as above mentioned.

This papaw, in its eastern limits, extends to the seaboard in the South Atlantic States, to central New Jersey (east and west), and northward in New York (west of the Hudson River) about to the latitude of the northern shore of Lake Ontario; the northern limit takes in the southern part of the Province of Ontario, most of Michigan (the Lower Peninsula), southeastern Wisconsin, and the southern half or more of Iowa. Westward the distribution extends to and includes southeastern Nebraska, the eastern parts of Kansas and Oklahoma, and northeastern Texas. Southward it extends in the Gulf States to within 100 miles or so of the Gulf, but includes northeastern Florida. This, roughly, is the eastern half of the United States, excluding eastern New York and New England.

Within the range of the natural distribution of the papaw, there are large areas where it rarely occurs. It is at its best when growing in rich alluvial soil along river bottoms or in other moderately moist locations where there is considerable shade. Almost any good, strong, rich soil that is well-drained will grow papaws. Soils where the black ash, mayapple, and ginseng grow are good for papaws.

Status of the Papaw

In much of the area where the papaw occurs it attracts but little attention, while in some sections it is highly prized by many. However, it is rarely cultivated, the fruit that is harvested being nearly all gathered from wild trees or those that have grown up by chance. The few plantings that have been made have each consisted of only a small number of trees.

There are few if any named varieties available for planting, though names have been given in a few cases to especially desirable varieties. For instance, the late James A. Little applied the name Uncle Tom to a favorite tree. This is said to be the first name given to a papaw variety. The late Benjamin Buckman, of Illinois, listed several

papaw variety names, including Cheely, Hann, Early Best, Arkansas Beauty, Scott, Endicott, "Hope's August," and "Hope's September"; he also listed Little's Uncle Tom. It is possible that still other names have been published, but it is doubtful whether any of the named varieties have been propagated, at most, beyond the limited local needs of a few papaw enthusiasts.

Habits of Growth

When growing by itself, the papaw tree may attain a height of 20 to 30 feet (rarely 40 feet is claimed) and reach a trunk diameter of 10 or 12 inches, but when growing in a clump or thicket, as is commonly the case, the individuals develop a somewhat shrubby habit and may not attain a height of more than 10 to 15 feet. When papaws grow in thickets, locusts and mulberries sometimes intermingle with them.

A clump of papaw trees may develop from suckers that grow up about an original seedling tree, or it may be augmented by its own seedlings that grow from seeds in fruits that drop to the ground. Such clumps may attain considerable age, at least two having been recorded that had been known for as long as 50 years. While many of the individuals in these clumps had died from time to time, the thickets had been perpetuated by suckers or sprouts, or by new trees grown from seed. It is said that the sprouts will sometimes blossom at 3 years of age, although seedling trees are much slower in reaching fruiting age. While claims of fruiting at 3 or 4 years from seed have been made and may sometimes occur, the usual age for bearing seems to be 6 or 8 years.

The smooth, glossy leaves, commonly 6 to 10 inches long, give a striking appearance to the trees, which, with the blossoms that develop on growth of the previous season and which may expand to a diameter of 2 inches, are not without some ornamental value.

Age of Trees

Under favorable conditions a papaw tree may attain great age. Trees supposed on good evidence to be 80 and perhaps 100 years old are on record; others 8 or 9 inches in diameter are mentioned, from which the owners have gathered fruit for 60 years. These trees were reported as being still in good condition.

The Fruit and Its Characteristics

The fruit of the papaw varies widely in size, form, and eating quality. There are two rather distinct types so far as the fruit is concerned. They do not differ botanically, though there seem to be certain correlations, in some cases at least the trees of the two types differing in shape of leaf, odor, color of bark, and in other ways. In one type the fruit is relatively small, not over 2 or 3 inches in length on an average, the flesh whitish or light-colored, the texture soft and rather watery, with a disagreeable flavor. The other as a rule is larger, the fruits sometimes attaining a length of 6 inches or more and 2½ or 3 inches in thickness and weighing one-half to three-fourths of a pound; fruits weighing a pound are said to occur.

The seeds are conspicuous, numerous, brownish-colored, shiny, and arranged lengthwise of the fruit in a double row. They vary in size in different fruits, but may reach a length of 1 inch. The flesh is yellow, of a creamy texture when fully ripe, with a rich flavor pleasing to those who like papaws. When a fruit is cut, the flesh gives off a characteristic pungent odor.

Many do not care for the fruit, while others, disliking it at first, quite readily acquire a fondness for it. However, there is considerable difference in the eating quality of the different yellow-fleshed forms.

Time of Ripening

It is a common notion that papaws, and also persimmons, require the action of frost to ripen them. Both notions are erroneous. As with native persimmons, many forms of papaws mature so late that they do not ripen until after frosts have occurred; but the early forms ripen regardless of frost, and the late ones would also if frost held off long enough.

The fruit on different trees, or on different clumps where each clump has developed from sprouts from a single "mother" tree, may ripen from August to November. The bulk of the fruit probably ripens during September and October. Very late ripening fruit may hang on the tree long after the leaves have dropped following the autumn frosts.

As the fruits develop, they are first green, this color being retained till they begin to ripen. Then they turn yellow, becoming brown as they approach edible maturity.

Time of Picking

The stage of maturity of the fruit when picked is a factor in its dessert quality. It is said that fruits that give the highest degree of satisfaction are picked just as they begin to soften and then are allowed to ripen in a cool temperature. If placed in a refrigerator in a fairly hard condition and left for 2 or 3 weeks or until soft, especially pleasing results are claimed. When fully ripe and held in the open air, the fruit does not usually keep very long.

Yields

A yield of from one-half to 1 bushel for a tree 6 to 8 inches in diameter and 15 or 20 feet high is considered reasonably good. The larger-fruited forms are commonly borne in pairs, while the smaller ones may occur in clusters of six or eight fruits.

The papaw, both tree and fruit, is singularly free from insect pests and diseases.

Propagation

The propagation of the papaw presents difficulties. As a matter of fact, however, not much attention has been given to propagation problems. Fairly desirable fruit from the wild has been sufficient to meet the demands; hence the drive of necessity has not been much felt. With the gradual clearing up of the lands where papaws thrive best, this situation will naturally change, and then the induce-

ment will likely be sufficient to stimulate the successful meeting of the propagation problems.

Vegetative Methods

Grafting is difficult; budding is said to be even more so. The habit of sprouting or suckering, heretofore mentioned, offers at present the most effective means of multiplying a particular variety. This method has its difficulties because the suckers do not transplant readily. A rather large percentage of loss seems likely in any transplanting that is attempted. Small plants not more than 2 years old seem to be the most satisfactory for this purpose. The habit of suckering suggests the possibility, even if not the probability, of ready propagation from root cuttings, but it is not known that this method has been tried.

Seedage

Apparently the most successful method of multiplying trees, without respect to variety perpetuation, is by planting the seeds. Only those from the most desirable types of fruit should be used, though the types do not come true from seed. Such selection, however, offers the best basis of securing the largest proportion of trees that produce good fruit.

Reproduction from seeds is more difficult than with most fruits. The seeds should be planted, or at least stratified, while still fresh. If planted in the fall, or stratified and planted in the spring, the seedlings will probably not appear before July or August, and some of the seeds may not germinate until the following spring.

Sometimes the entire fruit is placed in the ground without the seeds being removed from the pulp, and then the plants are thinned out later if necessary. When planted after removal from the pulp, the seeds should be covered with about three-fourths of an inch of soil, though covering to a depth of 2 inches is advised by some. Sometimes a light mulch of straw or litter of some kind is spread over the seedbed as an aid in retaining moisture.

Obviously the seedbed should be thoroughly prepared, and the soil should be fertile. The young seedlings make a rather slow growth at first, even under the best of conditions; hence the advisability of making all the conditions as favorable for growth as possible.

Moreover, the small seedlings are impatient of too much sunlight and may fail if they are not given protection in some way. Some persons have had success in growing seedlings under the shade of overtopping persimmon or other trees. A common recommendation, however, is to plant the seeds in a hill as watermelons are planted and then to place a barrel with both heads removed over the place where the seeds are planted, leaving it in this position until the seeds germinate and the seedlings reach a height of perhaps 12 to 18 inches. Then they may be transplanted to permanent locations, this being done, of course, when the seedlings are in a dormant condition. Trees 12 to 18 inches in height are transplanted more successfully than larger ones. The seedlings grow very slowly, a height of perhaps not more than 3 or 4 inches being reached the first year. It may require 2 or 3 years for the trees to grow large enough to transplant, but

after they reach a height of 15 to 20 inches they usually grow more rapidly.

As the branches of papaw trees are rather brittle, planting in locations that are protected from severe winds is desirable. They are often seen thriving in thin woods where all the other underbrush has been cleared away and where the overhanging branches are not so interwoven as to cut off too much of the sunlight.

Cultivation

The fact that but few plantings of the papaw have ever been made is indicative of the limited knowledge available concerning its cultural requirements under domestication and its response to treatment that would represent good cultural conditions for other tree fruits.

It is usually reasoned that native wild fruits brought into cultivation will improve under the more favorable conditions for growth that are implied by such treatment, as compared with those that they endure in their struggle for existence in nature. This does not necessarily follow, however, especially in the case of a fruit or plant that in nature is part of such a plant society as is the native papaw. The fact that it seems to thrive as an underling with overtopping trees, in the plant society of which it is often a part, may suggest that cultivation in the open in the manner of a peach or cherry orchard might not be altogether according to its liking. In this field, however, speculation is easy and facts mostly lacking.

The use of stable manure and of the potash supplied in wood ashes is said to have produced favorable response from trees to which they were applied. The author of A Treatise on the Pawpaw claims that the best response was obtained by applying the plastering from an old building. The extent to which this is true may indicate the value of lime in correcting the acidity of soils for papaws. Here again speculation runs ahead of established fact, since apparently the response of papaw trees to soils definitely known to be acid has never been observed.

Uses

Little is known about the food value of the papaw. It is relatively low in water content compared with other fruits and correspondingly high in solids, which are chiefly carbohydrates. Its fuel value is about 435 calories per pound, which is higher than for most fruits. Neither its mineral nor vitamin content has been determined.

The primary use of the fruit is for eating out of hand in the fresh state. By many enthusiasts it is considered a fruit of surpassing dessert quality, while others see in its peculiar aroma and flavor little to commend it—at least until after a taste for it has been acquired. Occasionally the eating of this fruit is followed by uncomfortable symptoms, though this rarely happens. It may be eaten with cream and sugar or used in making puddings and as filling for "custard pie." The pulp may be beaten and mixed with cream and then frozen like ice cream. Various other ways of using the fruit are also mentioned by different writers.

U. S. GOVERNMENT PRINTING OFFICE: 1939